



Australian Government

Australian Institute of
Health and Welfare

Health, wellbeing and body weight

Characteristics of overweight and obesity in Australia, 2001

Highlights

Overweight, and in particular obesity, is known to be associated with numerous adverse health conditions. This report looks at a number of self-reported health-related characteristics recorded in the 2001 National Health Survey and analyses how they vary by weight category.

Self-assessed health status and quality of life

- Obese people were considerably more likely to report fair or poor health than their healthy weight counterparts (26.4% versus 17.3% for men, 28.4% compared with 15.5% for women).
- Compared with women in the healthy weight range, obese women were less likely to report being delighted or pleased with their life (38.0% versus 44.5%).

Long-term health conditions

A number of long-term health conditions were more prevalent among people who were obese than those who were of healthy weight:

- Self-reported diabetes (8.7% compared with 2.2% for women, 7.7% versus 3.8% for men).
- Heart and circulatory conditions (30.8% and 38.8% compared with 21.9% and 23.8% for men and women respectively). Clear gradients were seen between the degree of overweight and the prevalence of heart and circulatory conditions.
- High blood pressure (28.3% compared with 11.8% for women, 21.6% versus 11.6% for men).
- High blood cholesterol (12.9% versus 8.4% for men, 12.1% compared with 7.6% for women).

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Health behaviours

- A higher proportion of men in the healthy weight range were current smokers than those who were obese (29.5% compared with 23.5% respectively).
- Obese people were more likely than those of healthy weight to have been sedentary or participated in very low levels of physical activity (34.8% versus 30.4% for men, and 38.2% compared with 30.2% for women), and less likely to have participated in high levels of physical activity (4.9% compared with 7.6% for men, and 1.7% compared with 4.6% for women).
- Overweight people were more likely to report usually consuming skim milk than people of healthy weight (10.5% versus 7.8% for men, 19.7% versus 15.4% for women).

Health service use

- Obese women were more likely than healthy weight women to report having visited a hospital or day clinic or consulted a doctor in the previous 2 weeks.

Introduction

Overweight, and in particular obesity, is acknowledged to be at epidemic levels worldwide, with Australia being one of the worst affected nations. The 2001 Australian Bureau of Statistics (ABS) National Health Survey (NHS), showed that more than 7 million Australian adults (aged 18 years and over) were overweight (based on self-reported data) (AIHW: Dixon & Waters 2003). The prevalence of obesity was 17% in women and 16% in men, up from 10% and 9% respectively since 1989–90.

The health risks of overweight and obesity are well recognised. Excess weight increases the risk of developing Type 2 diabetes, cardiovascular disease, high blood pressure, certain cancers, sleep apnoea and osteoarthritis (WHO 2000). Overweight and obesity are also associated with a reduced life expectancy (AIHW: Mathers et al. 1999; McIntyre 1998; Segal et al. 1994). Recent data from the United States of America suggest a severe level of obesity (body mass index of 35 or more) during early adulthood (ages 20–30 years) may reduce a life expectancy by 3 years or more (Fontaine et al. 2003).

As well as impacting on morbidity and mortality, overweight and obesity have been shown to be associated with psychological and social problems (McIntyre 1998; WHO 2000). Overweight or obese people may be subject to discrimination and negative attitudes surrounding body weight.

This bulletin, which complements other work produced by the Australian Institute of Health and Welfare (AIHW) on overweight and obesity, investigates the relationship between this growing public health problem and a number of health-related characteristics using national estimates from the 2001 NHS. The previously published bulletins compared trends in overweight and obesity in Australia and internationally (AIHW: Dixon & Waters 2003) and between selected groups of Australians (AIHW: O'Brien & Webbie 2003). Together, these bulletins provide timely data on the prevalence of overweight and obesity in Australia and their distribution and health-related consequences across different population groups.

Statistical analysis

The association between relative body weight and various health-related characteristics was examined using nationally representative data from the 2001 NHS. Self-reported height and weight were used to calculate body mass index (BMI), a commonly used measure of body weight adjusted for height (Box 1). The categories of BMI used were healthy weight, overweight but not obese and obese. These are consistent with standard BMI classifications (NHDC 2003; WHO 2000). Healthy weight was treated as the reference category and data were analysed separately for men and women.

Although BMI is reasonably correlated with body fat in most people, it does not distinguish between weight due to muscle and weight due to fat (WHO 2000). The classification of BMI, its use as a population health measure and its limitations in different populations are described in greater detail in the companion bulletins AIHW: Dixon & Waters (2003) and AIHW: O'Brien & Webbie (2003).

The primary purpose of the analyses reported here is to present national estimates of the health characteristics of adult Australians by weight category and to document any differences observed. Data were sourced from the NHS, which collected information on a number of health-related characteristics, such as self-assessed health status, long-term conditions, health behaviours and health service use, which enabled the relationships between these characteristics and BMI to be explored. More information on the NHS and the variables analysed is in Appendix 1. Care should be taken when interpreting the results. Although it is possible to show statistical associations between variables, it is not possible to infer causal relationships on the basis of these cross-sectional data alone.

Box 1: Classifying overweight and obesity

The most common population-level measure of overweight and obesity is the body mass index (BMI). BMI is an index of weight relative to height and is calculated by dividing weight in kilograms by the square of height in metres (kg/m^2).

For adults (people aged 18 years and over), healthy weight is classified as a BMI in the range of 18.5 to less than 25, overweight is defined as a BMI of 25 or more, with obesity defined as a BMI of 30 or more. These classifications are based primarily on the association between BMI and mortality, and are the standard recommended by the World Health Organization (WHO). (For more information, see AIHW: Dixon & Waters 2003).

In this bulletin, we have analysed:

- healthy weight ($18.5 \leq \text{BMI} < 25$)
- overweight ($\text{BMI} \geq 25$)
 - overweight but not obese ($25 \leq \text{BMI} < 30$) (known as preobese by WHO)
 - obese ($\text{BMI} \geq 30$).

For children and adolescents, a separate classification of overweight and obesity based on age and sex is recommended as height and body composition are continually changing.

Sources: Cole et al. 2000; WHO 2000.

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An important limitation of these data should be noted. BMI derived from self-reported data generally underestimates the true prevalence of overweight and obesity, as respondents often under-report their weight and over-report height (ABS 1998a; Flood et al. 2000; Waters 1993). This has the potential to underestimate the health burden associated with overweight and obesity.

Analyses in this bulletin are for adults aged 20 years and over, with the exceptions of analyses by diabetes status, high blood pressure, high blood cholesterol and physical activity (25 and over), and days away from work or study (20–64 years). All results are age-standardised to the 2001 Australian population.

Self-assessed health status and quality of life

Self-assessed health

Results from the 2001 NHS showed that the majority of people considered their health status to be good, very good or excellent (Figure 1). No differences in self-assessed health status were observed between those who were overweight but not obese and those who were of healthy weight. However, significantly more obese men (26.4%) and obese women (28.4%) reported fair or poor health than healthy weight men and women (17.3% and 15.5% respectively) (Table A1).

These results are consistent with those of previous studies showing that obese people are more likely to report an excess burden of poor health (Brown et al. 2000; Ford et al. 2001; WHO 2000).

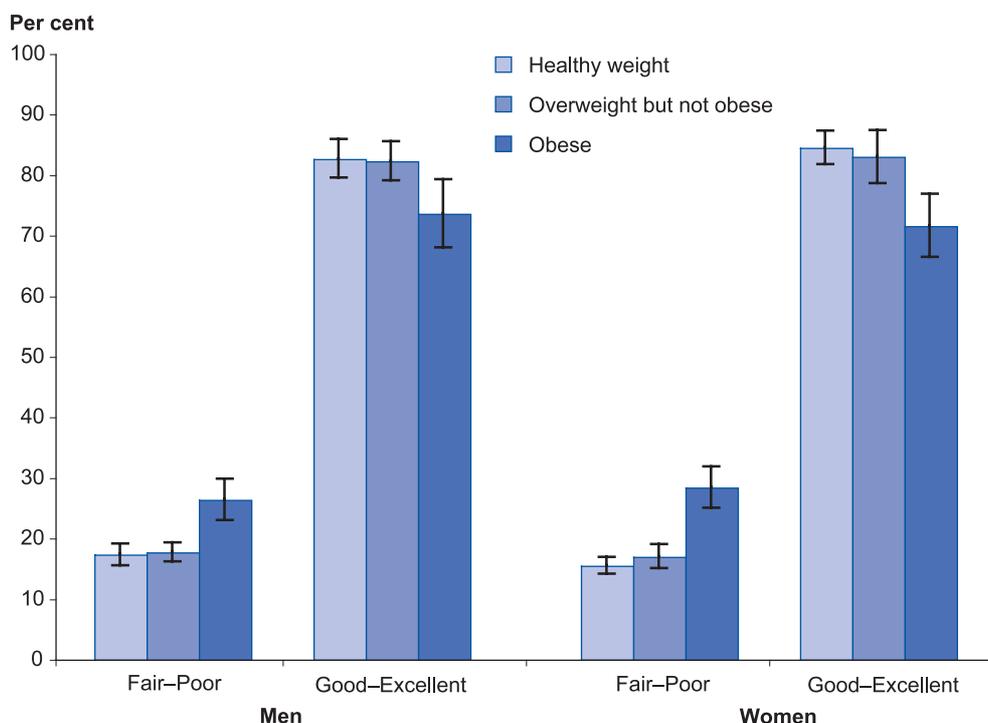
Quality of life

The 2001 NHS measured quality of life using an indicator of life satisfaction. Respondents were asked a general question about how they felt about their life based on the events of the previous year, and what they expected to happen in the future.

Compared with women in the healthy weight range, fewer obese women reported being delighted or pleased with their life (38.0% versus 44.5%). Correspondingly, obese women were more likely to report mixed feelings (i.e. feeling equally satisfied and dissatisfied) or being dissatisfied with their life (23.4% and 7.0% compared with 17.1% and 4.9% respectively) (Table A2). There was little variation in self-reported quality of life and weight status among men.

Quality of life is a subjective measure representing an individual's perception about various areas of life (Kinney 1999). Results from other studies, while not directly comparable with the 2001 NHS due to differences in the concepts measured, generally found that people who were obese reported a lower quality of life. Han et al. (1998) found that people in the Netherlands with high BMI had a reduced quality of life and were more likely to have disabilities affecting daily living. Similarly, obesity in American adults was found to be associated with impaired health-related quality of life (Ford et al. 2001). In both of these studies, physical functioning was affected more than mental functioning. A study of the English population also found that physical wellbeing decreased as the degree of overweight increased (Doll et al. 2000). Like the NHS, these studies were based on cross-sectional data.

Figure 1: Self-assessed health status of men and women aged 20 years and over, by weight category, 2001



Notes

1. Age-standardised to the 2001 Australian population.
2. Error bars indicate 95% confidence intervals.

Source: AIHW analysis of the 2001 ABS National Health Survey.

Long-term health conditions

Being overweight is associated with many chronic or long-term health conditions (such as Type 2 diabetes and cardiovascular disease). The relationships between overweight and the number of long-term conditions reported, diabetes status and heart/circulatory conditions were investigated in the following analyses.

Number of long-term conditions reported

Long-term conditions are those that have lasted or are expected to last for 6 months or more. The proportion of those reporting no long-term conditions was significantly lower for obese people of both sexes: 9.9% of obese men compared with 13.6% of healthy weight men, and 6.6% of obese women compared with 10.7% of healthy weight women (Table A3).

Obese men were more likely than healthy weight men to have five or more long-term conditions (26.1% compared with 19.0%). Similarly, proportionally more obese women reported five or more long-term conditions than women of healthy weight (36.6% compared with 23.1%).

The results for overweight but not obese men and women were similar to the results for obesity, although the differences from those of healthy weight were not as marked.

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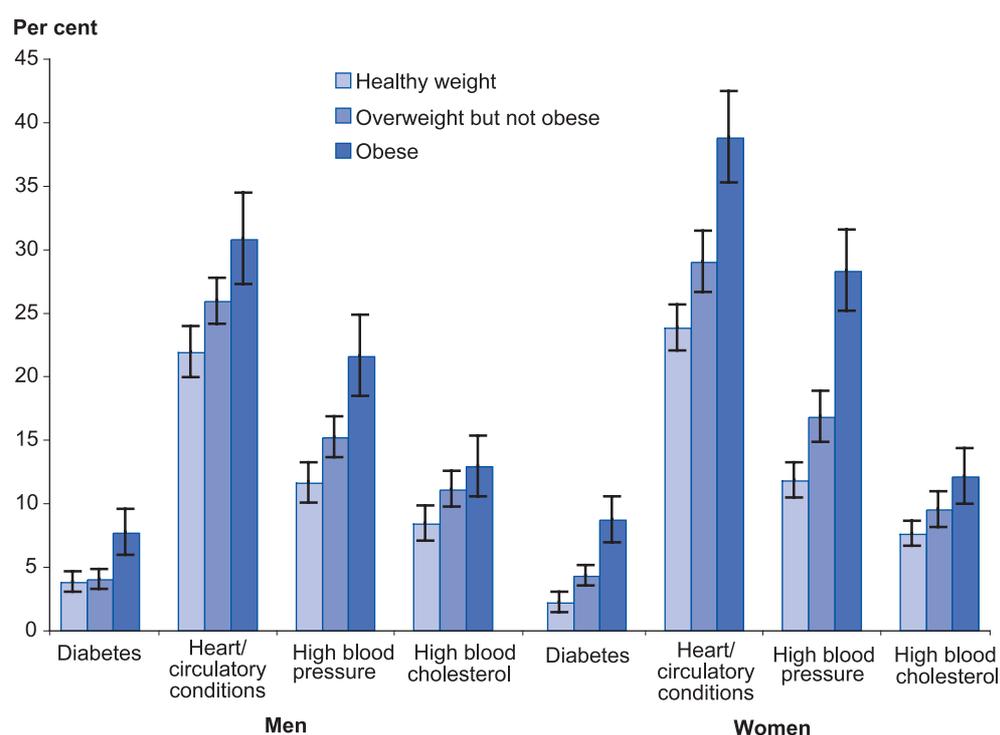
Diabetes

Obesity has been identified as a key risk factor for Type 2 diabetes, and the risk of developing Type 2 diabetes increases continuously with BMI (AIHW 2002; WHO 2000).

Self-reported diabetes was four times as prevalent among obese women than healthy weight women (8.7% and 2.2% respectively). Obese men were twice as likely to report diabetes than healthy weight men (7.7% compared with 3.8%) (Table A4). These results are for all types of diabetes; however, Type 2 diabetes represents about 85–90% of cases of diabetes (AIHW 2002).

For women, the likelihood of reporting diabetes rose with each increasing weight category: that is, overweight but not obese women were more likely to report diabetes than healthy weight women, and obese women were more likely than overweight but not obese women to report diabetes. This gradient was not apparent in men (Figure 2).

Figure 2: Prevalence of selected conditions for men and women, by weight category, 2001



Notes

1. Age-standardised to the 2001 Australian population.
2. Error bars indicate 95% confidence intervals.
3. Heart/circulatory conditions include high blood pressure and high blood cholesterol.
4. Diabetes, high blood pressure and high blood cholesterol results for persons aged 25 years and over.
5. Heart/circulatory conditions for persons aged 20 years and over.

Source: AIHW analysis of the 2001 ABS National Health Survey.

While causality cannot be inferred from these results, the observed gradient in diabetes prevalence based on weight status for women is consistent with literature relating the risk of developing Type 2 diabetes to the degree of overweight (WHO 2000).

Heart and circulatory conditions

The relationship between excess weight and cardiovascular disease has also been extensively documented. Weight gain is associated with cardiovascular disease risk in both men and women, with a greater risk being associated with a longer duration of overweight (Hubert et al. 1983; Wilson et al. 2002).

While obesity is a risk factor for developing high blood pressure and high cholesterol (which themselves are risk factors for cardiovascular disease), it is also an independent risk factor for cardiovascular disease. Furthermore, the degree of overweight is related to the risk of developing cardiovascular disease (WHO 2000).

Heart and circulatory conditions comprise a range of heart, vascular and related conditions, as well as high blood pressure and high blood cholesterol (which are also risk factors). In the 2001 NHS, proportionally more obese than healthy weight men reported having been told by a doctor or nurse that they had a heart or circulatory condition (30.8% compared with 21.9%) (Table A4). Similarly, a greater proportion of obese women reported having a heart or circulatory condition than women of healthy weight (38.8% compared with 23.8%). Overweight but not obese men and women were also more likely than healthy weight men and women to report a heart or circulatory condition (Figure 2).

As with diabetes in women, the likelihood of reporting a heart or circulatory condition rose with each increasing weight category. This gradient was observed for both men and women, but was more pronounced for women (Figure 2).

High blood pressure

Obese women were nearly three times as likely to report having high blood pressure than women of healthy weight (28.3% and 11.8% respectively). Correspondingly, a much higher proportion of obese men reported having high blood pressure than healthy weight men (21.6% compared with 11.6%) (Table A4). These results are not surprising. High blood pressure is a commonly recognised complication of overweight and obesity. Blood pressure has been found to increase as BMI increases, and people who are obese have been found to have a much higher prevalence of high blood pressure (Kuller 1999; Stamler 1991; WHO 2000). As with all heart and circulatory conditions, an increased prevalence of high blood pressure was observed for each increasing weight category, for both men and women (Figure 2).

High blood cholesterol

Proportionally more obese men reported having high blood cholesterol than healthy weight men (12.9% and 8.4% respectively). Similarly, a greater proportion of obese women reported high cholesterol levels than women of healthy weight (12.1% compared with 7.6%) (Table A4). While high cholesterol was found to be more prevalent among obese men and women than healthy weight men and women, there was little difference between the overweight but not obese and obese groups (Figure 2). Obese people often have abnormal lipid levels, where plasma triglycerides and low-density lipoproteins ('bad cholesterol') are raised (WHO 2000).

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Health behaviours

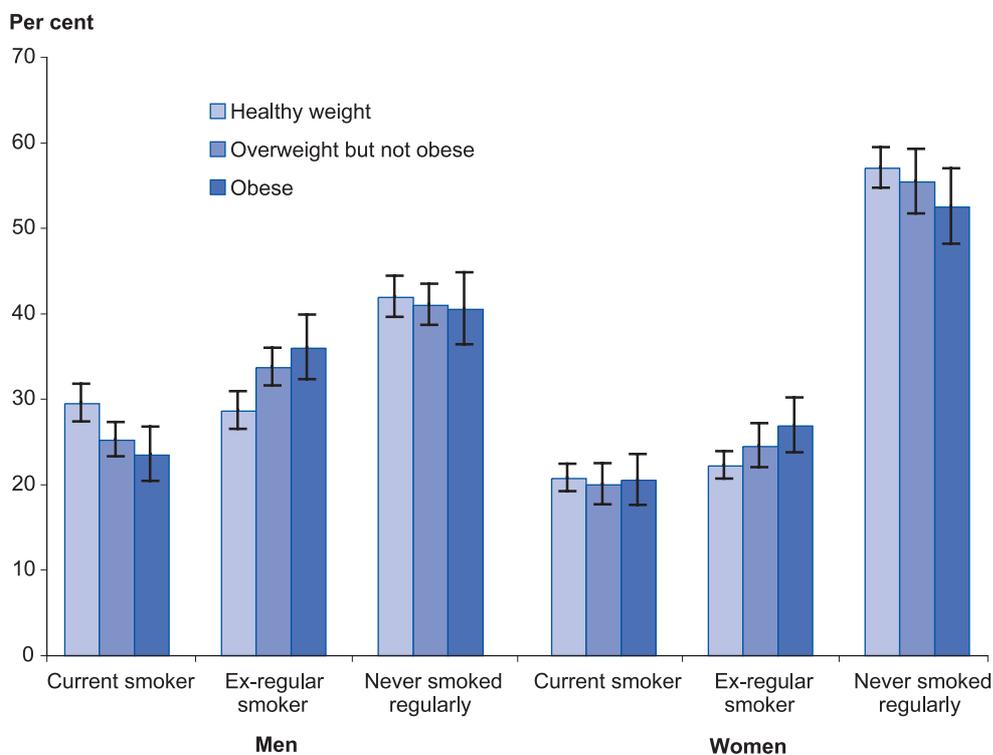
The health behaviours examined in the following analyses were tobacco smoking, physical activity and diet. These three behaviours can be risk factors for a number of conditions, for example insufficient physical activity is a risk factor for cardiovascular disease. There can be a modifiable element to risk factors, which may be reduced or eliminated through lifestyle changes, such as smoking cessation, increasing physical activity and improving nutrition.

Smoking

Studies have shown a significant relationship between smoking and BMI, with current smokers having a lower BMI than never-smokers (Boyle et al. 1994; Molarius et al. 1997).

Our analysis of the 2001 NHS found that, among men, a higher proportion of those classified as healthy weight were current smokers (29.5%) compared with those who were obese (23.5%) (Table A5). More obese men reported being ex-smokers than healthy weight men (36.0% compared with 28.6%), but no differences were seen for men who had never smoked regularly. While the result for male ex-smokers is consistent with previous research showing that giving up smoking is associated with weight gain (Flegal et al. 1995), a lesser difference was seen for women in our analysis (Figure 3).

Figure 3: Smoking status of men and women aged 20 years and over, by weight category, 2001



Notes

1. Age-standardised to the 2001 Australian population.
2. Error bars indicate 95% confidence intervals.

Source: AIHW analysis of the 2001 ABS National Health Survey.

While we did not find any great differences in smoking status for women based upon their weight category (particularly for current smokers), other studies have found a relationship. Results from the 1999–2000 Australian Diabetes, Obesity and Lifestyle Study (AusDiab) (Cameron et al. 2003) showed that female smokers were less likely to be obese (based upon BMI) than their non- or ex-smoking counterparts. Furthermore, Lahti-Koski et al. (2002) found that both male and female ex-smokers were more likely to be obese than never-smokers.

Some studies have investigated whether decreasing trends in smoking could explain the increasing prevalence of overweight and obesity. Both Boyle et al. (1994) and Simmons et al. (1996) concluded that the decrease in smoking in the Australian and New Zealand populations could not help explain the increasing rates of overweight and obesity seen in adults in those countries. Both of these studies found that BMI increased across all smoking categories, with Simmons et al. (1996) proposing that dietary factors were the most likely cause.

Physical activity

Insufficient physical activity is a risk factor for numerous physical and mental health conditions including cardiovascular disease, Type 2 diabetes, several cancers, as well as overweight and obesity (AIHW: Armstrong et al. 2000). Not only are people who are physically inactive more likely to be obese, regular participation in physical activity plays an important role in weight reduction and weight maintenance (Ross et al. 2000; WHO 2000).

In the 2001 NHS, respondents were grouped into exercise levels (sedentary/very low, low, moderate and high) based on a score derived from self-reported information about the frequency, duration and intensity of physical activity during the previous 2 weeks. For example, a respondent who reported 30 minutes of moderate intensity activity on 11 days out of the last fortnight would be classified as participating in moderate levels of physical activity (for more information, see ABS 2003). It should be noted that the NHS questions related to leisure-time physical activity only. Physical activity undertaken for reasons other than exercise, sport or recreation was not examined.

Obese men were significantly less likely to report participating in moderate (21.7%) or high (4.9%) levels of physical activity compared with healthy weight men (29.1% and 7.6% respectively) (Table A6).

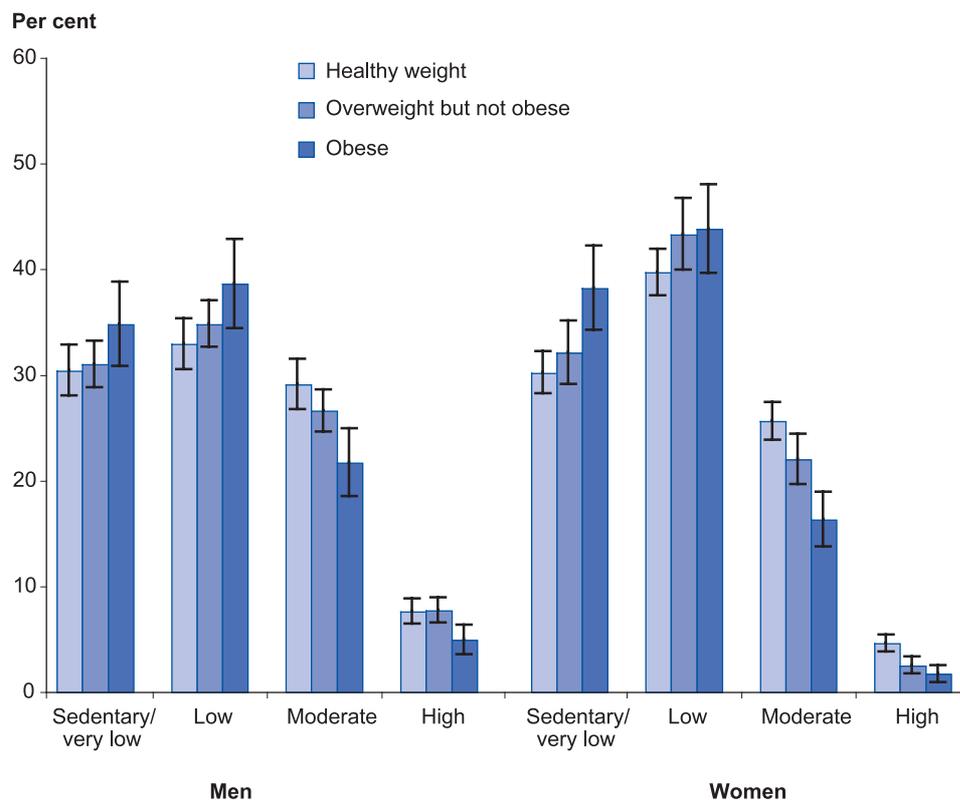
Compared with women in the healthy weight category, overweight women also reported doing less physical activity overall. In particular, obese women were less likely to participate in high (1.7%) or moderate amounts of physical activity (16.3%) than women of healthy weight (4.6% and 25.6% respectively). At the same time, obese women were significantly more likely to participate in sedentary/very low levels of physical activity than those of healthy weight (38.2% compared with 30.2%) (Table A6) (Figure 4).

The National Physical Activity Guidelines for Australians recommend 30 minutes of moderate intensity physical activity on most (preferably all) days of the week as the minimum requirement for good health (DHAC 1999). It is difficult to directly compare the NHS physical activity levels with these recommendations. However, the majority of NHS respondents classified as participating in moderate or high levels of physical activity can be considered to be meeting the guidelines. The guidelines also recommend that for additional health and fitness benefits, 30 minutes or more of vigorous activity

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on 3–4 days of the week should be added to the minimum recommendation. NHS respondents classified as participating in high levels of physical activity can be considered to be meeting these additional levels of activity.

Figure 4: Participation in physical activity by men and women aged 25 years and over, by weight category, 2001



Notes

1. Age-standardised to the 2001 Australian population.
2. Error bars represent 95% confidence intervals.

Source: AIHW analysis of 2001 ABS National Health Survey.

The NHS data are not directly comparable with other studies examining physical activity patterns of Australians, due to different methodologies used (such as the data collection method, the recall period, type of exercise and method of calculating exercise levels) (AIHW 2003). Nevertheless, the 2000 National Physical Activity Survey, which used the Active Australia Survey methodology, indicated that overweight, and particularly obese, people were less likely to undertake physical activity at the levels recommended to achieve health benefits (AIHW: Armstrong et al. 2000). Analysis of the 1999–2000 AusDiab also found that obese women participated in less physical activity than non-obese women (Cameron et al. 2003).

The relationship between current physical activity patterns and weight should be interpreted with caution. The effect of physical activity on body weight happens over time, and current physical activity patterns may not necessarily reflect usual participation in physical activity.

Dietary behaviour

The 2001 NHS collected information on selected dietary behaviours, including daily vegetable and fruit intake. Increased fruit and vegetable consumption can contribute to a reduction in overall energy intake (WHO 2003), and total energy intake is a key factor affecting weight regulation (NHMRC 2003). Overall, there were few associations between relative weight and reported fruit and vegetable intake (Tables A7 and A8). Among women, those who were obese were more likely to report not eating fruit (6.1%) than those of healthy weight (3.7%). This relationship was not observed for men.

Information on type of milk usually consumed was also obtained in the 2001 NHS. Previous analyses have shown that people who usually use whole milk have significantly higher proportions of total energy from fat and saturated fat than those who report usually using skim or reduced fat milk (Rutishauser et al. 2001). Little variation was seen in the proportion of men and women who reported usually consuming whole milk by weight category (Table A9).

Interestingly, men in the overweight category were more likely to report usually consuming skim milk (10.5%) compared with healthy weight men (7.8%). Correspondingly, overweight women were more likely to report consuming skim milk (19.7%) than women of healthy weight (15.4%) (Table A9). Regular use of fat-reduced milk by people who were overweight or obese may reflect an attempt to reduce weight or consume a lower fat diet.

Self-reported data relating dietary behaviour and weight should be interpreted with caution. The effect of the diet on body weight happens over time, and measures of dietary behaviour do not indicate food intake—the NHS did not collect information on food intake. The 1995 National Nutrition Survey, which collected detailed information on food intake, found that as BMI increased energy intake decreased. While some overweight people may consume less energy consistent with lower physical activity levels or dieting, there may be under-reporting of food consumption (ABS 1998b).

Health service use

Overweight and obesity place a burden on the health care system because of associated physical and psychological health problems. Some indicators of this impact are presented in this section. Overweight and obesity are also associated with costs more broadly, such as decreased productivity due to work days lost and mortality costs (Gorstein & Grosse 1994; McIntyre 1998).

Hospitals/day clinics

In 2001, obese women were more likely than healthy weight women to report having visited a hospital or day clinic in the previous 2 weeks (7.8% and 5.3% respectively) (Table A10). Among men no relationship was found between weight category and reported hospital or day clinic use. These outcomes show some consistency with a study of the 1995 NHS showing that BMI was positively associated with visits to hospital accident and emergency departments in women, and hospital outpatient clinics for both men and women (Reidpath et al. 2002).

Doctors and other health professionals

Obese women were more likely to have consulted a doctor in the two weeks before interview than healthy weight women (37.9% compared with 29.6%). No strong

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relationship was observed for men. No differences by weight category were seen in the proportion of men and women consulting a health professional other than a doctor (Table A10). The analysis of the 1995 NHS by Reidpath et al. (2002) found that, compared with people of healthy weight, obese men and women were more likely to have consulted a doctor and overweight and obese women were more likely to have visited another health professional. Seidell & Deeregerg (cited in McIntyre 1998) also found that overweight people were more likely to consult their general practitioner than people of healthy weight.

Health-related actions

No relationships were observed between relative weight and days away from work or study (due to personal illness or injury) in the 2 weeks prior to interview (Table A11). Similarly, analysis of 2001 NHS data did not show differences in other days of reduced activity—that is, whether they cut down on activities other than work or study (due to personal illness or injury)—based on weight category.

Discussion

This analysis of the 2001 NHS suggests that overweight and obesity have unfavourable health consequences and that these influence men and women differently, with associated problems being generally more pronounced for women. In line with previous analyses of the NHS (AIHW: O'Brien & Webbie 2003), results were most pronounced for obesity compared with healthy weight. Note that it is not possible to determine causality or draw firm conclusions regarding the long-term implications of overweight and obesity from these analyses.

Both men and women who were obese reported poorer health and lower quality of life than people of healthy weight. This is not surprising given that we found obese people more likely to report a number of health conditions or risky health behaviours.

People who were overweight were more likely than their healthy weight counterparts to report five or more long-term conditions (any illness, injury or disability having lasted or expected to last 6 months or more, e.g. diabetes). Clear gradients were seen in the relationship between the degree of overweight and the prevalence of diabetes (for women), and heart/circulatory conditions for men and particularly for women. For example, overweight but not obese people were more likely to report having high blood pressure than people of healthy weight, and obese people were more likely than overweight but not obese people to report having high blood pressure.

Trends in the distribution of BMI have suggested that the whole Australian population is gaining weight (AIHW: O'Brien & Webbie 2003). If these trends continue, considering the evidence that the prevalence of some health conditions such as Type 2 diabetes relate to the degree of overweight (WHO 2000), these conditions are likely to become an increasing concern in the future.

Several studies have shown that regular smokers tend to have lower BMI than people who have never smoked or are ex-smokers. Our results for men are consistent with this research—more obese men reported being ex-smokers and fewer reported being current smokers than healthy weight men—although we saw no pattern for women.

Obese men and women were less likely to participate in moderate to high levels of physical activity than their healthy weight counterparts. Physical activity is important in controlling body weight, and insufficient physical activity is an independent risk factor for many chronic diseases. In fact, physical inactivity ranked second after tobacco

smoking in terms of overall disease burden from risk factors in Australia in 1996 (AIHW: Mathers et al. 1999).

While increased fruit and vegetable consumption can contribute to a reduction in overall energy intake (WHO 2003), this analysis showed that overweight people were no more or less likely to report consuming more than one serve of fruit, or more than one serve of vegetables, than men and women of healthy weight. However despite evidence that consumption of whole milk is associated with a greater intake of calorie-rich fat in the diet, overweight people were more likely to consume skim milk than healthy weight men and women. The effect of dietary behaviour on body weight happens over an extended period of time, and these seemingly counter-intuitive results suggest that the observed relationship between dietary behaviour and weight status may be confounded by actions aimed at modifying weight.

Our results provide further evidence that people who are overweight have an increased burden of ill health and use of health services. Obese women were more likely to have visited a hospital or day clinic or consulted a doctor in the 2 weeks before interview than healthy weight women.

Overweight and obesity was found to account for 4.3% of all Disability Adjusted Life Years (DALYs) in Australia (a DALY is a year of healthy life lost from mortality or disability) (AIHW: Mathers et al. 1999). Of the 4.3% of DALYs attributed to overweight and obesity, 1.2 percentage points were due to Type 2 diabetes and 1.3 percentage points were from ischaemic heart disease.

The relationships between overweight and obesity and various health-related characteristics were different for men and women. For example, obese women were less likely to feel delighted/pleased with life than healthy weight women, whereas no difference was seen for men. Similarly, obese women were more likely to have consulted a doctor in the 2 weeks prior to interview than healthy weight women, but no difference was seen for men. The gradients between weight category and long-term health conditions were also stronger for women than for men. However, we observed a relationship between weight category and smoking status for men, but not for women. Some of these differences may be influenced by the overall difference in health-related characteristics between the sexes. For example, men overall were more likely to be current or ex-smokers than women, and women in general were more likely to have consulted a doctor. Having a larger sample size for a group makes it easier to observe statistically significant differences between weight categories.

Our analyses considered each of the health characteristics in isolation; however, many of the characteristics are related. For example, obesity is a risk factor for cardiovascular disease, high blood pressure and Type 2 diabetes, yet both high blood pressure and Type 2 diabetes are risk factors for cardiovascular disease (AIHW 2001). Furthermore, insufficient physical inactivity is related to overweight and obesity, yet it too is an independent risk factor for cardiovascular disease.

As a cross-sectional survey, the NHS measures the characteristics of the population at a single point in time, and so causal relationships cannot be inferred from the results. This is particularly important when considering results for health behaviours. While smoking, insufficient physical activity and poor dietary behaviour all negatively affect health, stopping smoking, increasing participation in physical activity and improving nutrition all positively affect health. The ability to modify one's behaviour is likely to be different for various factors. So it might be that a person who is overweight has changed their dietary patterns in an attempt to improve their health. These longer-term effects cannot be determined through our analysis.

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Conclusion

The problem of overweight and obesity is widespread across the Australian population, with one in six (16.7%) Australians aged 20 years and over being classified as obese. The analyses presented here found that overweight and particularly obesity were related to a number of other adverse health conditions and behaviours, such as fair or poor self-reported health, diabetes, heart and circulatory conditions, and low participation in leisure-time physical activity. The nature of the survey data analysed do not allow cause and effect conclusions to be made. However, our results highlight the excess burden of poor health experienced by overweight and particularly obese Australians.

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Appendices

Appendix 1: Methods and data sources

Rates

Age-standardised rates are used to remove the influence of age when comparing populations with different age structures. The 2001 Australian population has been used as the standard population for all age-standardised estimates.

Confidence intervals

Estimates in this document are presented with 95% confidence intervals. Confidence intervals are an indication of the amount of variation associated with an estimate. These are shown as error bars on each column of the graphs or alongside the estimates in the tables. These confidence intervals indicate that if the process that led to the estimated value were repeated many times, in 95% of cases the true population value would fall within that confidence interval. Estimates in this bulletin are considered to be statistically significantly different if their confidence intervals do not overlap.

Due to the large amount of data presented in this bulletin, more rigorous tests for statistical differences were not applied. If two confidence intervals do overlap, the estimates may still be statistically significantly different in some cases. Readers should note that we did not adjust the confidence intervals to compensate for multiple comparisons. It is possible that some observed statistically significant differences may be due to chance.

Data sources

National Health Survey: conducted in 2001 by the Australian Bureau of Statistics and designed to obtain national information on the health status of Australians, their use of health services and facilities, and health-related aspects of their lifestyle. In the survey, information on self-reported height and weight was collected from respondents aged 15 years and over. The 2001 survey collected information from approximately 26,900 respondents over the period from February to November 2001.

Notes on variables analysed

Self-assessed health status was derived from respondents' rating of their general health against a subjective 5-point scale. Analysis was grouped to fair–poor and good–excellent. These questions come from the Short Form 36 (SF36).

Quality of life was derived from the Delighted–Terrible Scale, with analysis being grouped to delighted/pleased, mostly satisfied, mixed (equally satisfied and dissatisfied), and dissatisfied (mostly dissatisfied, unhappy, terrible). (See ABS 2003 for more information).

Long-term conditions were defined as medical conditions which were current at the time of the survey and which had lasted at least 6 months, or which the respondent expected to last for 6 months or more. These include a range of conditions from heart and circulatory conditions through to eyesight problems.

Diabetes status was categorised as 'currently has diabetes' or 'does not have diabetes'. Diabetes includes Type 1, Type 2 and other diabetes or diabetes of unknown type. People with high sugar levels were included in the 'does not have diabetes' group. Analysis was restricted to persons aged 25 years and over.

Heart and circulatory conditions includes a range of heart, vascular and related conditions, and refers to people who currently have the condition. High blood pressure and high blood cholesterol are both included in the overall measure of heart and circulatory conditions. The overall measure of heart and circulatory conditions was reported on for persons aged 20 and over, but analysis of high blood pressure and high blood cholesterol was restricted to persons aged 25 and over.

Categories of *smoking status* were current smoker, ex-regular smoker and never smoked regularly, and refer to the smoking of tobacco. Regular smoking was defined to be one or more cigarettes (or pipes or cigars) per day.

Participation in *physical activity* focused on leisure-time physical activity undertaken for recreation, sport or health/fitness purposes. Levels of physical activity were grouped as sedentary/very low, low, moderate and high based upon the respondent's estimated energy expenditure. For more information on the derivation of these categories, see ABS (2003). Analysis was restricted to persons aged 25 years and over.

A serve of *fruit* was defined as: one medium piece, two small pieces or one cup of diced fruit, being equivalent to about 150 g of fresh or 50 g of dried fruit. Respondents were asked about usual intake.

A serve of *vegetables* was defined as half a cup of cooked vegetables or one cup of salad vegetables, being equivalent to about 75 g. Respondents were asked about usual intake.

Type of milk consumed was categorised to whole milk, low/reduced-fat milk, skim milk and other. The category 'other' includes people who do not drink milk. Respondents were asked about usual intake.

Health, wellbeing and body weight

Health service use includes hospital and day clinic visits, consultation of doctors and consultations of other health professionals. Doctors include general practitioners and specialists. Other health professionals include dentists, physiotherapists, nurses, etc.

Health-related actions include days away from work or study (analysis for 20–64 year olds only) and other days of reduced activity.

Appendix 2: Statistical tables

Table A1: Self-assessed health status of men and women aged 20 years and over, by weight category, 2001

Weight category	Fair–Poor	Good–Excellent
Per cent (95% confidence interval)		
<i>Men</i>		
Healthy weight	17.3 (15.5–19.0)	82.7 (79.5–86.0)
Overweight	20.2 (18.8–21.6)	79.8 (77.2–82.3)
Overweight but not obese	17.7 (16.1–19.3)	82.3 (79.2–85.3)
Obese	26.4 (23.1–29.6)	73.6 (68.2–79.1)
<i>Women</i>		
Healthy weight	15.5 (14.1–16.9)	84.5 (81.8–87.3)
Overweight	21.6 (19.9–23.3)	78.4 (75.3–81.5)
Overweight but not obese	17.0 (15.0–18.9)	83.0 (78.7–87.4)
Obese	28.4 (25.1–31.6)	71.6 (66.5–76.8)

Note: Age-standardised to the 2001 Australian population.

Source: AIHW analysis of the 2001 ABS National Health Survey.

Table A2: Quality of life of men and women aged 20 years and over, by weight category, 2001

Weight category	Delighted/Pleased	Mostly satisfied	Mixed	Dissatisfied
Per cent (95% confidence interval)				
<i>Men</i>				
Healthy weight	42.5 (40.0–44.9)	33.8 (31.5–36.1)	18.3 (16.6–20.1)	5.4 (4.4–6.3)
Overweight	43.0 (41.1–45.0)	32.6 (30.8–34.3)	17.9 (16.5–19.2)	6.5 (5.7–7.4)
Overweight but not obese	44.1 (41.7–46.5)	33.1 (30.9–35.2)	16.6 (15.1–18.2)	6.2 (5.2–7.1)
Obese	40.4 (36.2–44.6)	30.9 (27.3–34.4)	21.1 (18.2–24.0)	7.6 (5.9–9.3)
<i>Women</i>				
Healthy weight	44.5 (42.4–46.6)	33.4 (31.5–35.4)	17.1 (15.7–18.6)	4.9 (4.1–5.7)
Overweight	39.7 (37.3–42.1)	34.3 (32.1–36.5)	20.3 (18.5–22.0)	5.8 (4.9–6.7)
Overweight but not obese	40.9 (37.7–44.2)	36.0 (33.1–39.0)	18.1 (16.0–20.3)	4.9 (3.8–5.9)
Obese	38.0 (34.0–41.9)	31.7 (28.3–35.1)	23.4 (20.4–26.3)	7.0 (5.5–8.5)

Notes

1. Age-standardised to the 2001 Australian population.
2. Dissatisfied includes mostly satisfied, unhappy and terrible.

Source: AIHW analysis of the 2001 ABS National Health Survey.

Table A3: Number of long-term conditions reported by men and women aged 20 years and over, by weight category, 2001

Weight category	None	One	Two	Three	Four	Five or more
Per cent (95% confidence interval)						
<i>Men</i>						
Healthy weight	13.6 (12.3–15.0)	19.1 (17.4–20.8)	20.2 (18.5–22.0)	15.7 (14.1–17.4)	12.3 (10.8–13.7)	19.0 (17.2–20.8)
Overweight	11.0 (9.9–12.2)	19.5 (18.1–20.9)	18.3 (17.0–19.7)	15.0 (13.7–16.2)	11.9 (10.8–13.0)	24.3 (22.8–25.8)
Overweight but not obese	11.4 (10.1–12.7)	20.4 (18.7–22.1)	17.6 (16.0–19.2)	15.2 (13.7–16.7)	11.9 (10.5–13.2)	23.5 (21.7–25.3)
Obese	9.9 (7.9–12.0)	17.4 (14.7–20.2)	20.4 (17.4–23.3)	14.4 (12.0–16.8)	11.8 (9.7–13.9)	26.1 (22.8–29.4)
<i>Women</i>						
Healthy weight	10.7 (9.6–11.7)	18.5 (17.1–19.9)	21.1 (19.5–22.7)	15.0 (13.6–16.3)	11.7 (10.4–12.9)	23.1 (21.5–24.8)
Overweight	7.2 (6.1–8.4)	16.4 (14.7–18.1)	15.5 (13.9–17.1)	17.0 (15.4–18.6)	12.4 (11.0–13.7)	31.5 (29.5–33.4)
Overweight but not obese	7.7 (6.2–9.2)	18.3 (16.0–20.6)	16.3 (14.2–18.4)	18.1 (15.9–20.3)	11.4 (9.8–13.1)	28.2 (25.8–30.6)
Obese	6.6 (4.9–8.3)	13.5 (11.1–15.9)	14.3 (11.9–16.7)	15.4 (13.0–17.8)	13.6 (11.4–15.8)	36.6 (33.0–40.1)

Notes

1. Age-standardised to the 2001 Australian population.
2. Some small cells in calculations for obese men and women.

Source: AIHW analysis of the 2001 ABS National Health Survey.

Table A4: Prevalence of selected conditions for men and women, by weight category, 2001

Weight category	Diabetes	Heart or circulatory condition	High blood pressure	High blood cholesterol
Per cent (95% confidence interval)				
<i>Men</i>				
Healthy weight	3.8 (3.0–4.7)	21.9 (20.0–23.8)	11.6 (10.1–13.1)	8.4 (7.1–9.7)
Overweight	5.1 (4.3–5.8)	27.3 (25.7–28.8)	17.0 (15.6–18.3)	11.6 (10.4–12.7)
Overweight but not obese	4.0 (3.3–4.8)	25.9 (24.0–27.7)	15.2 (13.7–16.8)	11.1 (9.7–12.4)
Obese	7.7 (5.8–9.5)	30.8 (27.2–34.3)	21.6 (18.4–24.7)	12.9 (10.5–15.2)
<i>Women</i>				
Healthy weight	2.2 (1.6–2.8)	23.8 (22.2–25.5)	11.8 (10.5–13.1)	7.6 (6.5–8.6)
Overweight	6.0 (5.1–6.9)	32.9 (30.9–34.8)	21.4 (19.7–23.0)	10.5 (9.3–11.7)
Overweight but not obese	4.3 (3.3–5.2)	29.0 (26.6–31.4)	16.8 (14.9–18.7)	9.5 (8.0–10.9)
Obese	8.7 (6.9–10.5)	38.8 (35.2–42.4)	28.3 (25.1–31.4)	12.1 (10.1–14.2)

Notes

1. Categories are not independent.
2. Age-standardised to the 2001 Australian population.
3. Diabetes category is for people reporting they currently have diabetes, all types. People aged 25 years and over.
4. Heart and circulatory conditions include high blood pressure and high blood cholesterol. People aged 20 years and over.
5. High blood pressure and high blood cholesterol presented for people aged 25 years and over.

Source: AIHW analysis of the 2001 ABS National Health Survey.

Health, wellbeing and body weight

Table A5: Smoking status of men and women aged 20 years and over, by weight category, 2001

Weight category	Current smoker	Ex-regular smoker	Never smoked regularly
Per cent (95% confidence interval)			
<i>Men</i>			
Healthy weight	29.5 (27.4–31.6)	28.6 (26.5–30.7)	41.9 (39.4–44.3)
Overweight	24.8 (23.2–26.4)	34.4 (32.7–36.2)	40.8 (38.8–42.7)
Overweight but not obese	25.2 (23.3–27.1)	33.7 (31.6–35.8)	41.0 (38.7–43.4)
Obese	23.5 (20.4–26.7)	36.0 (32.2–39.8)	40.5 (36.3–44.6)
<i>Women</i>			
Healthy weight	20.7 (19.2–22.2)	22.2 (20.6–23.9)	57.0 (54.7–59.4)
Overweight	20.2 (18.4–22.1)	25.5 (23.5–27.4)	54.3 (51.7–56.9)
Overweight but not obese	20.0 (17.7–22.4)	24.5 (22.0–27.0)	55.4 (51.8–59.1)
Obese	20.5 (17.5–23.5)	26.9 (23.7–30.1)	52.5 (48.2–56.9)

Note: Age-standardised to the 2001 Australian population.

Source: AIHW analysis of the 2001 ABS National Health Survey.

Table A6: Participation in physical activity by men and women aged 25 years and over, by weight category, 2001

Weight category	Sedentary/very low	Low	Moderate	High
Per cent (95% confidence interval)				
<i>Men</i>				
Healthy weight	30.4 (28.1–32.7)	32.9 (30.5–35.3)	29.1 (26.8–31.4)	7.6 (6.4–8.7)
Overweight	32.1 (30.3–33.9)	35.8 (33.9–37.6)	25.2 (23.6–26.9)	6.9 (6.1–7.8)
Overweight but not obese	31.0 (28.8–33.1)	34.8 (32.5–37.0)	26.6 (24.5–28.6)	7.7 (6.6–8.8)
Obese	34.8 (31.0–38.7)	38.6 (34.5–42.7)	21.7 (18.6–24.8)	4.9 (3.4–6.3)
<i>Women</i>				
Healthy weight	30.2 (28.2–32.1)	39.7 (37.5–41.8)	25.6 (23.7–27.4)	4.6 (3.8–5.4)
Overweight	34.5 (32.3–36.7)	43.6 (41.1–46.0)	19.7 (18.0–21.4)	2.2 (1.6–2.8)
Overweight but not obese	32.1 (29.3–35.0)	43.3 (39.9–46.7)	22.0 (19.6–24.5)	2.5 (1.7–3.3)
Obese	38.2 (34.3–42.0)	43.8 (39.7–48.0)	16.3 (13.8–18.7)	1.7 (1.0–2.5)

Notes

1. Age-standardised to the 2001 Australian population.
2. Some small cells in calculations for obese men and women.

Source: AIHW analysis of the 2001 ABS National Health Survey.

Table A7: Daily vegetable consumption by men and women aged 20 years and over, by weight category, 2001

Weight category	1 serve or less	2–3 serves	4–5 serves	6 serves or more
Per cent (95% confidence interval)				
<i>Men</i>				
Healthy weight	26.4 (24.4–28.4)	47.3 (44.7–49.9)	22.1 (20.2–24.0)	4.2 (3.3–5.0)
Overweight	25.9 (24.3–27.5)	46.2 (44.1–48.2)	23.7 (22.1–25.2)	4.3 (3.6–5.0)
Overweight but not obese	26.1 (24.2–28.1)	45.2 (42.8–47.6)	24.0 (22.2–25.8)	4.6 (3.8–5.5)
Obese	25.2 (22.0–28.5)	48.7 (44.1–53.2)	22.7 (19.7–25.8)	3.4 (2.3–4.4)
<i>Women</i>				
Healthy weight	17.6 (16.1–19.0)	49.1 (46.9–51.3)	27.8 (26.0–29.6)	5.5 (4.7–6.3)
Overweight	17.2 (15.5–18.9)	47.4 (44.9–49.9)	29.6 (27.5–31.6)	5.8 (4.9–6.7)
Overweight but not obese	15.4 (13.3–17.5)	48.3 (44.8–51.8)	30.0 (27.3–32.6)	6.3 (5.0–7.5)
Obese	19.9 (17.0–22.8)	46.3 (42.1–50.4)	28.7 (25.4–31.9)	5.2 (3.8–6.5)

Notes

1. Age-standardised to the 2001 Australian population.
2. 1 serve or less category includes people who do not eat vegetables.

Source: AIHW analysis of the 2001 ABS National Health Survey.

Table A8: Daily fruit consumption by men and women aged 20 years and over, by weight category, 2001

Weight category	Doesn't eat fruit	1 serve or less	2–3 serves	4 serves or more
Per cent (95% confidence interval)				
<i>Men</i>				
Healthy weight	7.9 (6.7–9.0)	45.1 (42.6–47.7)	37.6 (35.3–40.0)	9.4 (8.2–10.6)
Overweight	7.7 (6.8–8.7)	45.6 (43.6–47.6)	36.9 (35.1–38.8)	9.7 (8.7–10.7)
Overweight but not obese	7.5 (6.4–8.6)	46.5 (44.1–49.0)	36.0 (33.8–38.1)	10.0 (8.8–11.2)
Obese	8.5 (6.6–10.5)	43.2 (39.0–47.4)	39.3 (35.3–43.3)	9.0 (7.1–10.9)
<i>Women</i>				
Healthy weight	3.7 (3.0–4.3)	36.1 (34.2–38.1)	48.6 (46.3–50.8)	11.6 (10.4–12.8)
Overweight	4.9 (4.1–5.8)	35.3 (33.0–37.6)	49.4 (46.8–51.9)	10.4 (9.1–11.6)
Overweight but not obese	4.1 (3.1–5.1)	34.4 (31.4–37.4)	50.5 (47.0–53.9)	11.0 (9.4–12.6)
Obese	6.1 (4.6–7.6)	36.6 (32.8–40.4)	47.9 (43.7–52.1)	9.4 (7.6–11.2)

Note: Age-standardised to the 2001 Australian population.

Source: AIHW analysis of the 2001 ABS National Health Survey.

Health, wellbeing and body weight

Table A9: Type of milk usually consumed by men and women aged 20 years and over, by weight category, 2001

Weight category	Whole milk	Low/reduced-fat milk	Skim milk	Other
Per cent (95% confidence interval)				
<i>Men</i>				
Healthy weight	55.1 (52.3–57.8)	26.5 (24.4–28.5)	7.8 (6.7–9.0)	10.6 (9.3–11.9)
Overweight	51.5 (49.4–53.6)	30.0 (28.3–31.8)	10.5 (9.4–11.6)	7.9 (7.0–8.8)
Overweight but not obese	52.2 (49.6–54.7)	29.7 (27.7–31.8)	10.6 (9.3–11.8)	7.5 (6.5–8.6)
Obese	49.6 (45.0–54.1)	31.1 (27.5–34.7)	10.2 (8.2–12.2)	9.1 (7.2–11.0)
<i>Women</i>				
Healthy weight	39.8 (37.8–41.9)	33.1 (31.2–35.0)	15.4 (14.1–16.8)	11.6 (10.4–12.8)
Overweight	35.2 (33.0–37.5)	37.1 (34.9–39.4)	19.7 (18.0–21.4)	7.9 (6.9–9.0)
Overweight but not obese	33.8 (30.9–36.8)	37.9 (34.8–41.0)	19.8 (17.5–22.1)	8.5 (7.1–9.9)
Obese	37.2 (33.3–41.0)	36.1 (32.4–39.8)	19.7 (17.0–22.4)	7.0 (5.5–8.6)

Note: Age-standardised to the 2001 Australian population.

Source: AIHW analysis of the 2001 ABS National Health Survey.

Table A10: Health service use by men and women aged 20 years and over, by weight category, 2001

Weight category	Visited a hospital or day clinic	Consulted a doctor	Consulted another health professional
Per cent (95% confidence interval)			
<i>Men</i>			
Healthy weight	5.4 (4.4–6.3)	21.3 (19.4–23.2)	16.2 (14.6–17.9)
Overweight	5.9 (5.0–6.7)	24.5 (22.9–26.0)	15.5 (14.2–16.8)
Overweight but not obese	5.5 (4.6–6.4)	23.9 (22.1–25.7)	14.9 (13.4–16.4)
Obese	6.9 (5.2–8.6)	25.9 (22.6–29.2)	17.0 (14.4–19.6)
<i>Women</i>			
Healthy weight	5.3 (4.5–6.1)	29.6 (27.8–31.5)	21.7 (20.1–23.2)
Overweight	7.3 (6.2–8.3)	33.1 (31.0–35.3)	23.0 (21.2–24.8)
Overweight but not obese	6.8 (5.5–8.1)	29.9 (27.2–32.6)	22.7 (20.3–25.2)
Obese	7.8 (6.2–9.5)	37.9 (34.1–41.6)	23.3 (20.4–26.3)

Notes

1. Categories are not independent.
2. Age-standardised to the 2001 Australian population.

Source: AIHW analysis of the 2001 ABS National Health Survey.

Table A11: Health-related actions taken by men and women, by weight category, 2001

Weight category	Had days away from work or study	Had other days of reduced activity
Per cent (95% confidence interval)		
<i>Men</i>		
Healthy weight	7.6 (6.4–8.8)	9.2 (7.9–10.4)
Overweight	9.0 (7.9–10.1)	11.3 (10.2–12.4)
Overweight but not obese	8.9 (7.7–10.2)	11.2 (9.9–12.5)
Obese	9.0 (7.0–11.0)	11.4 (9.2–13.5)
<i>Women</i>		
Healthy weight	8.9 (7.8–10.0)	13.1 (11.9–14.4)
Overweight	8.4 (7.0–9.7)	14.1 (12.6–15.5)
Overweight but not obese	7.2 (5.6–8.8)	13.2 (11.4–15.0)
Obese	10.3 (7.8–12.7)	15.3 (13.0–17.7)

Notes

1. Categories are not independent. Relates to actions taken in 2 weeks prior to interview.
2. Age-standardised to the 2001 Australian population.
3. Had days away from work or study reported for persons aged 20–64 years only.
4. Had other days of reduced activity reported for persons aged 20 years and over.

Source: AIHW analysis of the 2001 ABS National Health Survey.

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